PAUL ALEXANDER LEVINE

M/S 300-323 • 4800 Oak Grove Dr. • Pasadena, CA 91109
(818) · 354 · 3258 • paul.a.levine@jpl.nasa.gov

EDUCATION

University of California, Irvine Irvine, CA
Ph.D in Earth System Science, **2019**
M.S. in Earth System Science, **2016**
Advised by Dr. James T. Randerson
Dissertation title: Land-atmosphere feedbacks in the energy, water, and carbon cycles of Earth system models
Awarded NASA Earth and Space Science Fellowship 16-EARTH16F-0196

University of California, Los Angeles Los Angeles, CA
M.A. in Geography, **2007**
Advised by Dr. Yongkang Xue
Thesis title: Remote sensing of land cover and climatology in relation to the population genomics of *Anopheles gambiae* in Cameroon, Central Africa

Brown University Providence, RI
B.A. in Geology/Biology, **2000**
Concurrent major in Computer Music and Multimedia
Elected to Sigma Xi: the Scientific Research Honor Society

PROFESSIONAL EXPERIENCE

University of California, Irvine September, 2014 – June, 2016
Teaching Assistant *Irvine, CA*

- Assisted with undergraduate teaching in the Department of Earth System Science
- Led regular weekly discussion sections and occasional lectures for the main course
- Responsible for working with students to plan and implement final group projects for small seminars in global and local environmental issues

Go Go Techs, Inc. March, 2010 – May, 2013
Information Technology Consultant *Santa Monica, CA*

- Design and deploy IT solutions for small businesses and home users
- Provide ongoing consultation services and technical support
- Assisted doctors' offices and small medical practices with transitioning to or upgrading electronic medical records systems

University of California, Los Angeles January, 2007 – December, 2009
Teaching Assistant *Los Angeles, CA*

- Assisted with undergraduate teaching in the Department of Geography
- Led weekly laboratory sections for courses in remote sensing and geographic information systems
- Created and evaluated hands-on laboratory activities for courses in remote sensing and geographic information systems

Woven Music December, 2002 – August, 2004
Multimedia Artist *Los Angeles, CA*

- Designed and implemented interactive video projection system for live musical performance
- Performed in small- to medium-sized venues throughout the USA

University of California Marine Sciences Institute June, 2000 – November, 2002
Research Associate *Mammoth Lakes, CA*

- Conducted research project on the benthic ecosystem of Mono Lake, CA
- Responsible for field and laboratory work, and analysis of results

SYNERGISTIC ACTIVITIES

- Contributor to the Reducing Uncertainties in Biogeochemical Interactions Through Synthesis and Computing (RUBISCO), a Science Focus Area in the Department of Energy concentrated on quantifying uncertainties in biogeochemical processes in Earth system models
- Contributor to the International Soil Radiocarbon Database (ISRaD), an international consortium of researchers using observations of carbon-14 to study soil processes
- Honorary fellow in the Machine Learning and Physical Sciences (MAPS) US National Science Foundation Research Traineeship program at UC Irvine
- Writer and managing editor for *The Loh Down on Science*, a science radio program hosted by Sandra Tsing Loh and syndicated by National Public Radio
- Volunteer for the Seed Consulting Group, providing *pro bono* consulting services to the American Red Cross and the Surfrider Foundation
- Selected to attend the 2017 ComSciCon National Workshop at Harvard University for graduate student leaders in science communication
- Participant in Climate Literacy Empowerment and Inquiry (CLEAN) Education, a 501(c)(3) non-profit dedicated to teaching the science of climate change to local primary- and secondary-school students
- Co-founder of UC Irvine School of Physical Sciences school-based council for Diverse Educational Community and Doctoral Experience (DECADE), an initiative dedicated to fostering an environment of diversity and inclusivity for graduate students
- Attended San Diego Supercomputing Center 2015 Summer Institute: HPC for the Long Tail of Science
- Attended 2014 JPL Center for Climate Sciences Summer School for remote sensing in climate research
- Attended 2014 Community Earth System Model (CESM) tutorial at the National Center for Atmospheric Research

JOURNAL PUBLICATIONS

Lawrence, C.R., J. Beem-Miller, A.M. Hoyt [et al., including **P.A. Levine**], *2019*, An open source database for the synthesis of soil radiocarbon data: ISRaD version 1.0, *Earth System Science Data Discussions*, doi:10.5194/essd-2019-55

Levine, P.A., J.T. Randerson, Y. Chen, M.S. Pritchard, M. Xu, and F.M. Hoffman, *2019*, Soil Moisture Variability Intensifies and Prolongs Eastern Amazon Temperature and Carbon Cycle Response to El Niño–Southern Oscillation, *Journal of Climate*, 32:4, 1273-1292, doi:10.1175/JCLI-D-18-0150.1

Levine, P.A., J.T. Randerson, S.C. Swenson, and D M. Lawrence, *2016*, Evaluating the strength of the land–atmosphere moisture feedback in Earth system models using satellite observations, *Hydrology and Earth System Science*, 20, 4837-4856, doi:10.5194/hess-20-4837-2016

Rian, S., Y. Xue, G.M. MacDonald, M.B. Touré, Y. Yu, F. De Sales, **P.A. Levine**, S. Doumbia, C.E. Taylor, *2009*, Analysis of climate and vegetation characteristics along the savanna-desert ecotone in Mali using MODIS data, *GIScience & Remote Sensing*, 46:4, 424-450, doi:10.2747/1548-1603.46.4.424

MANUSCRIPTS IN PREPARATION OR SUBMITTED

Levine, P.A., J.T. Randerson, Q. Zhu, W.J. Riley, A.M. Hoyt, S.E. Trumbore, Z. Shi, S.D. Allison, and F.M. Hoffman, *in prep.*, Geographic and vertical distribution of the 20th-century soil carbon sink in a radiocarbon-constrained Earth system model.

Shi, Z., J.T. Randerson, S.D. Allison, **P.A. Levine**, and S.E. Trumbore, *in prep.*, Limited carbon sequestration potential of global soils implied by radiocarbon observations.

Mamalakis, A., J.T. Randerson, J.Y. Yu, M.S. Pritchard, G. Magnusdottir, P. Smyth, **P.A. Levine** and E. Foufoula-Georgiou, *Submitted to Nature Climate Change*, Diverging regional response of the intertropical convergence zone to climate change

DATABASE CONTRIBUTIONS

Lawrence, C.R., J. Beem-Miller, A.M. Hoyt [et al., including **P.A. Levine**], *2019*, The International Soil Radiocarbon Database v1.0, doi:10.5281/zenodo.2613911

CONFERENCE PRESENTATIONS

Levine, P.A., J.T. Randerson, Q. Zhu, W.J. Riley, A.M. Hoyt, S.E. Trumbore, Z. Shi, S.D. Allison, and F.M. Hoffman, *2019*, Global Radiocarbon Observations Constrain the Soil Carbon Sink in the Energy Exascale Earth System Model, Presented at 2019 Chapman Conference: Understanding Carbon Climate Feedbacks, AGU San Diego, Calif., 26–29 Aug.

Randerson, J.T., M. Mu, **Levine, P.A.**, A.M. Hoyt, W.J. Riley, F.M. Hoffman, and S.E. Trumbore, *2019*, The carbon-climate feedback from sea level rise, Presented at 2019 Chapman Conference: Understanding Carbon Climate Feedbacks, AGU San Diego, Calif., 26–29 Aug.

Hoyt, A.M., C.A. Sierra, C.R. Lawrence [et al., including **P.A. Levine**], *2019*, Radiocarbon as a Constraint on Global Soil Carbon Cycling, Presented at 2019 Chapman Conference: Understanding Carbon Climate Feedbacks, AGU San Diego, Calif., 26–29 Aug.

Levine, P.A., J.T. Randerson, Q. Zhu, W.J. Riley, A.M. Hoyt, S.E. Trumbore, Z. Shi, S.D. Allison, and F.M. Hoffman, *2019*, Global radiocarbon observations suggest a reduced soil carbon sink in the Energy Exascale Earth System Model, Presented at 2019 CESM Land Model and Biogeochemistry Working Group Meetings, NCAR, Boulder, Colo., 11–13 Feb.

Levine, P.A., J.T. Randerson, Q. Zhu, W.J. Riley, A.M. Hoyt, S.E. Trumbore, Z. Shi, S.D. Allison, and F.M. Hoffman, *2018*, Global carbon-14 observations constrain rates of soil organic matter decomposition in the Energy Exascale Earth System Model, Abstract B33B-03 presented at 2018 Fall Meeting, AGU, Washington, D.C., 10–14 Dec.

Mueller, N., A.J. Rigden, E.E. Butler, P.J. Huybers, **P.A. Levine**, J.T. Randerson, *2018*, Correlated soil moisture and temperature extremes and potential biases in climate impact projection, Abstract GC54A-04 presented at 2018 Fall Meeting, AGU, Washington, D.C., 10-14 Dec.

Xu M., F.M. Hoffman, S. Mahajan, J. Mao, **P.A. Levine**, *2018*, Oceanic drivers for tropical terrestrial carbon cycle and extreme, Abstract GC13B-07 presented at 2018 Fall Meeting, AGU, Washington, D.C., 10-14 Dec.

Xu M., F.M. Hoffman, **P.A. Levine**, N. Collier, *2018*, ENSO Effects on the Terrestrial Carbon Cycle in the Tropics, Abstract BG04-A016 presented at 2018 Asia Oceania Geosciences Society Annual Meeting, AOGS, Honolulu, Hawaii, 3–8 Jun.

Levine, P.A., M. Xu, Y. Chen, J.T. Randerson, and F.M. Hoffman, *2018*, Soil moisture variability intensifies and prolongs eastern Amazon temperature and carbon cycle response to ENSO in CLM4.5, Presented at the 23rd Annual CESM Workshop, Biogeochemistry Working Group Session, NCAR, Boulder, Colo., 18–20 Jun.

Levine, P.A., M. Xu, Y. Chen, J.T. Randerson, and F.M. Hoffman, *2017*, Remote SST Forcing and Local Land-Atmosphere Moisture Coupling as Drivers of Amazon Temperature and Carbon Cycle Variability, Abstract H42B-08 presented at 2017 Fall Meeting, AGU, New Orleans, Louisiana, 11-15 Dec.

Levine, P.A., J.T. Randerson, D.M. Lawrence, and S.C. Swenson, *2016*, Evaluating land-atmosphere moisture feedbacks in Earth system models with spaceborne observations, Abstract H51I-1635 presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 11-15 Dec.

Hoffman, F.M., M. Xu, N. Collier, C. Xu, B.O. Christoffersen, Y. Luo, D.M. Ricciuto, **P.A. Levine**, J.T. Randerson, *2016*, Development of a tropical ecological forecasting strategy for ENSO based on the ACME modeling framework, Abstract B42A-08 presented at 2016 Fall Meeting, AGU, San Francisco, Calif., 11-15 Dec.

Levine, P.A., C. De Linage, I. Velicogna, and J.T. Randerson, *2014*, Global spaceborne assessment of the relationship between terrestrial water storage and evaporative demand, Abstract H24F-02 presented at 2014 Fall Meeting, AGU, San Francisco, Calif., 15-19 Dec.

TECHNICAL ABILITIES AND INTERESTS

- Familiarity with Earth system models and experience using the Community Earth System Model (CESM) and Energy Exascale Earth System Model (E3SM)
- Experience evaluating Earth system models using remote sensing and *in situ* observational data sets, including with the International Land Model (ILAMB) diagnostic suite
- Ability to conduct scientific field work, including under strenuous conditions and in remote locations
- Experience with large scale analytical methods, including classification and machine learning, evolutionary optimization algorithms, and data assimilation
- Ability to communicate science to audiences with a broad range of prior knowledge, including colleagues at science meetings, primary school through college students, and NPR listeners
- Experience using a range of computing systems, from the supercomputing platforms of the National Energy Research Scientific Computing Center (NERSC) to small-scale Linux clusters
- Diagnose and repair hardware and software in Macintosh, Windows, and Unix-like computer systems; configure and administrate TCP/IP networks
- Program in Python, IDL, Matlab, and R numerical packages; script in HTML, `bash`, and LaTeX; debug and modify code in C and Fortran programming languages
- Conversational Spanish, basic German
- Play piano, keyboards, percussion, and drums, including sight reading and sight singing